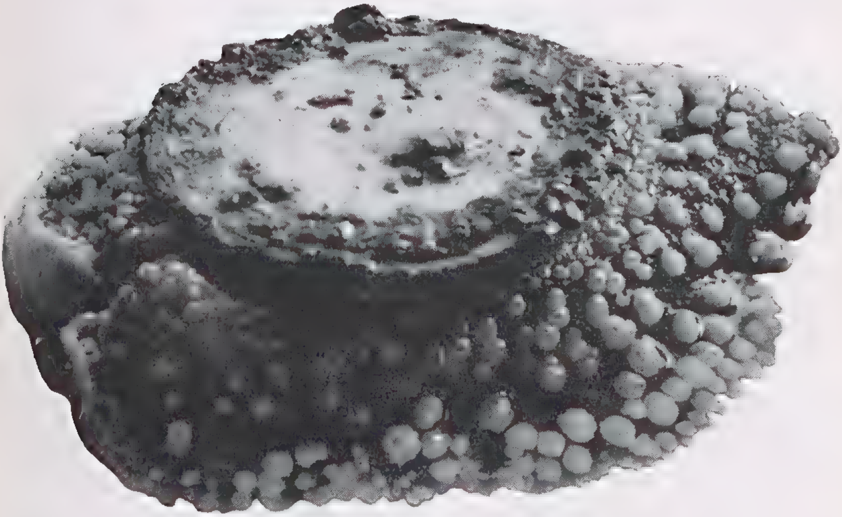
EGG LAYING AND EARLY DEVELOPMENT OF *UMBRACULUM SINICUM* GMELIN

By THELMA W. HARTLEY *

Pls. 5-7.

On January 29th, 1964, while collecting on an extremely low tide at Dunwich, North Stradbroke Island, Queensland, I found a specimen of *Umbraculum sinicum* Gmelin. It was a magnificent creature of bright orange colour, covered with soft, rounded, white pustules, apparently filled with a fluid substance. They stood out most vividly against the background colour of the animal.

The animal measured nine inches in length and stood a little over four inches in height when found. The oval shell was three and a half inches long and three inches wide. The *Umbraculum* was found on a small mound of dry sand on One Mile Beach at Dunwich, although I understand they normally burrow into the mud and are often found in pairs. The sandy mud is bordered by spongy coral reef at One Mile Beach.



Pl. 5: *Umbraculum sinicum* Gmelin, living specimen.

The animal moved slowly over the sand displaying an undulating motion around the outer edge of the foot. Occasionally the shell was raised about an inch when the black eyes on pinkish stalks were protruded. The eyes are not quite terminal, but are set back a fraction of an inch from the end of the eye stalk, the part distal to the eye being capable of some protrusion. The gill is on the right-side and the shell is consequently larger on the right side, which makes the "knob" or apical

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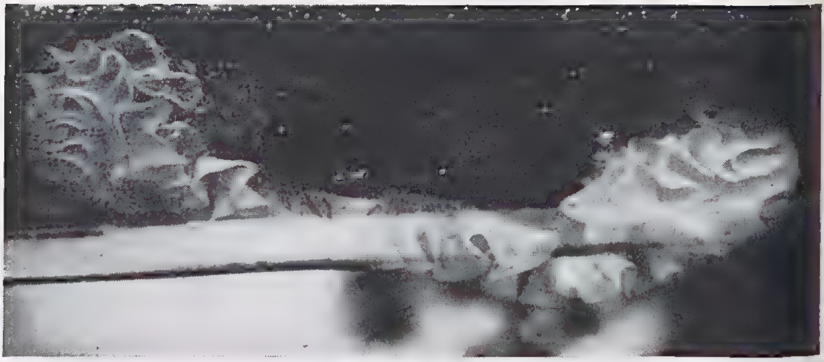


Pl. 6: Egg ribbon of *Umbraculum* photographed through about four inches of water.

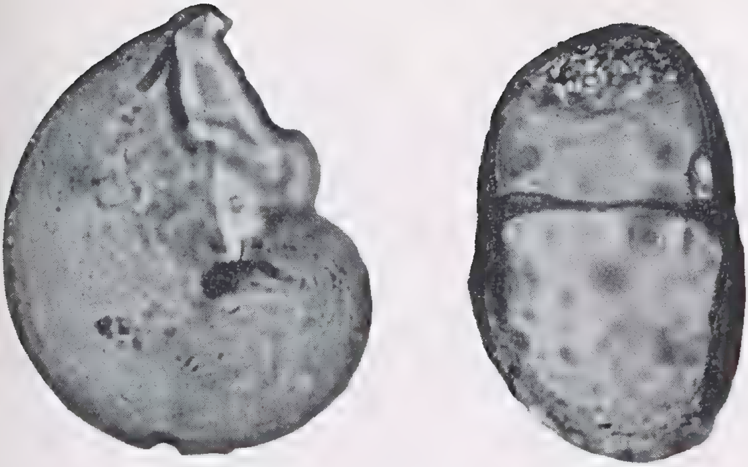
papilla on the dorsal surface of the shell eccentric. The gill is completely concealed when the shell is pulled down close against the body, and is set in a 'scooped' out oval depression immediately below the shell, the shape of the depression following the outline of the shell.

This was, without a doubt, the most impressive and extraordinary creature I had ever had the good fortune to collect. I took it immediately to the University of Queensland's Marine Laboratory at Dunwich and placed it in an aerated tank until I could take it back to Brisbane with me.

On February 2nd, four days after the animal was placed in the tank on Dunwich, it was transferred to a container of sea water, preparatory to the ferry trip to Brisbane. I thought at this time the animal seemed 'smaller', and when returned to an aquarium in Brisbane, it definitely was much smaller in size. The shrinkage may have been due to the more concentrated tank environment drawing water from the animal.

During the night, following its return to an aquarium in Brisbane, the *Umbraculum* crawled to the very top of the side of the aquarium and there laid a pinkish lavender egg ribbon. It was heavily pleated with half inch wide folds spaced about eight folds to the inch, making its free border about four feet long. The attached border was about one foot in length. The free border was without egg-capsules in the outermost two millimetres. The egg-capsules were imbedded in a transparent, gelatinous and tough mucus. The ribbon measured ¾ inch in width, $\frac{1}{16}$ inch in thickness, with about one hundred and twenty egg-capsules per half inch. Each capsule contained a dozen embryos, making a total of approximately one hundred thousand in the egg ribbon.

The animal took over four hours to place this exquisite fluted ribbon on the side of the tank. The next evening the animal crept along until it located the end of the ribbon where it stayed some hours then went back behind the rocks in the aquarium without adding to the length of the ribbon.



Pl. 7: Two photographs of the embryos of *Umbraculum*. Magnification approx. X300.

The embryos, when examined three weeks later, were still unhatched, but upon close examination from the side the embryos appeared to be shaped like a miniature *Nautilus* shell and, on looking into the 'opening', they appeared to be a spiral shell with an aperture and not just a flat plate. The colour of the ribbon had changed to dark brown as the embryos developed.

Unfortunately the animal died after being in the tank for two weeks. The eggs blackened after three weeks and disappeared completely from the tank's side.

The *Umbraculum* shell possesses growth lines externally, but internally it possesses a circular muscle scar, a glorious shade of burnt sienna which is enclosed in a larger circle or halo of brown.